

## NOTES ON AFRICAN CHALCIDOIDEA—II.

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## Family EULOPHIDAE.

## Genus PLEUROTROPIS, Förster.

In the confusion existing as to the meaning of the various Entedonine genera, I think it best to define the sense in which *Pleurotropis* is employed in the following pages. The essential character of the genus is, I take it, the presence on the smooth propodaeum of two central keels, which diverge apically to meet the raised posterior edge of the segment. There are also present two lateral keels, as a rule strongly developed, running (*inside* the oval raised spiracle) along the edge from which the descent to the pleura begins. The lateral keels join the posterior edge above a generally slightly protruding angle inside the insertion of the metacoxae. The general shape of the propodaeum is transversely quadrate, not truncately triangular as in *Entedon*. The petiole, which joins the propodaeum by a distinct, though often very short, process, is pitted, quadrate or even sub-pentagonal in section. The proportion of the first abdominal tergal surface to the whole visible surface varies sexually and specifically from less than one-third to three-quarters.

The scutellum shows the usual Entedonine bristles. The parapsidal furrows vary in distinctness in different species, but can, I think, always be traced by altering the position and illumination of the specimen under examination. They seem invariably to bend rather abruptly at about the middle of the mid lobe, which bears apically at the sides a distinctive seta. The area round the seta may be depressed or smooth, or different in sculpture from the rest of the mid lobe.

The head is generally broad, and the eyes are bare, pubescent, or completely hairy. The antennae in both sexes have nearly always eight joints: scape, pedicel, ring joint, three in the funicle and two in the club, with the terminal spur not articulated. In the female the funicle and first club joints are generally more cylindrical and increasingly stouter; in the male they are more bead-like and of equal breadth. The ring joint is very small, but highly magnified (600–1,000) shows a complex laminate structure. Proximally there is the usual short stalk of insertion with the pedicel, and the dorsal edge is solid and chitinised. When the antenna bends upwards the ring joint is seen to consist of two to three laminae, which are distinctly separated only ventrally.

Förster (Hym. Stud., ii, p. 78, 1856) includes *Pleurotropis* with *Entedon* amongst the genera with less than twelve joints in the antennae, and further remarks (*op. cit.* p. 82): "Die Fühler sind in beide Gattungen achtgliedrig, oder wenn man den griffel an der spitze des letzten Gliedes mitzählen will, neungliedrig, beim ♀ mit zwei ringeligem, beim ♂, mit nicht geringelten Endglied."

According to Ashmead (Mem. Carn. Mus., i, pp. 341, 342, 1904) there are ten joints in the antennae: "Scape, pedicel, ring joint, four funicular, and three in the club." In this reckoning, the "Endgriffel," or spur, is counted as a joint, but in the African

species I have personally examined, this equivalence cannot be maintained. But even allowing for this, there is still a discrepancy between the number of joints given by Ashmead and Förster respectively. Ashmead was evidently acquainted with species, reckoned by him as *Pleurotropis*, Först., which possess a four-jointed funicle, and Crawford (Bull. U.S. Dept. Agric., Tech. Ser. no. 19, pt. ii, 1910) suggests that one such form, *P. atamiensis*, Ashmead, is probably an undescribed genus. In the paper just quoted Crawford states that in several Japanese species the ♀♀ have a three-jointed funicle, and presumably the American species to which he has supplied a key (Proc. U.S. Nat. Mus., xliii, p. 177, 1913) answer to this description. In any case *P. telenomi*, Crawford (Proc. U.S. Nat. Mus., xl, p. 445, 1911), from Uganda, has three funicular joints and otherwise agrees with the sense in which *Pleurotropis* is here employed.

The fore wing of the genus is remarkable for the great development of the marginal vein which is sometimes over twice as long as the submarginal. The tiny bristles on the clypeus have evidently considerable value for the taxonomist, but they are hard to observe and seldom well preserved. I have discussed them only in describing *P. neavei*, sp. n. Generally the malar space is large and triangular, but it may be much reduced. The mouth-parts of *Pleurotropis* are of great importance. While the trophi are of the usual Entedonine type (see under *P. neavei*), the mandibles exhibit much diversity. They may be bidentate, with equal or unequal teeth, and more or less deeply cleft. The inner apical edge of the inner tooth may be straight, swollen, or minutely serrate. Probably the most natural characters for the separation of the genus into species, or at any rate, groups of closely allied species, are to be found here. Fundamental as these slight differences appear to be, I have not based the following short key on mandibular characters, chiefly because material for dissection has not been available in the case of all the species.

The scutellum and propodaeum also afford most important characters. In the former, differences of sculpture and pattern can be easily expressed, but I have found it almost impossible to put into words the moulding of the propodaeum. Mr. Terzi's skilful drawings give an adequate representation of this region in the species now described. In the discussion of various surface levels and light values between author and artist recourse to modelling in plasticine has had satisfactory results. On the notum of the propodaeum the chief points to be attended to are the curvature of the median keels, their distance apart and the nature of the hollows before the stalk, e.g., whether single or multiple, shining or dull; and in the latter case, whether smooth or pitted. On the pleura the position and size of the stigma are of value.

The chief variation of the propodaeum in any species seems to occur inside the central keels, where false or incomplete keels are frequently thrown up. The distal hollows are much more constant.

In the case of the wings, antennae, and leg joints, the measurements have been taken from balsam mounts. Those of the visible segments of the abdomen, the total length of each species, and its alar expanse are more approximate, being taken from card-mounted specimens, by slipping a micrometer on to the diaphragm of the eyepiece (no. iii., with objective  $\alpha_3$ ) of a binocular dissecting microscope. For detailed descriptions, the same objective, with eyepiece no. v. has been used. The

measurements of tarsal joints have been taken along the dorsal edge, and the fourth joint reckoned as extending to about the middle of the empodium, *i.e.*, to the bend of the claw, as this is the point at which the eye naturally rests in comparing the fourth with the other joints.

In describing *P. neavei*, sp. n., many details of generic value only have been mentioned; in the others, comparative features mainly have been emphasised.

The available evidence suggests very strongly that the species of *Pleurotropis* will prove to be hyperparasites upon other parasitic Hymenoptera; and if this be so, they must be regarded in many cases as noxious insects.

*Key to Species of Pleurotropis, Förster, described from Africa and Persia.*

1. Wings limp . . . . . 2  
 Wings distinctly tinged with brown; mandibles large, falcate, protruding. . . . . *clinognathus*, sp. n.
2. Hind tibiae concolorous to apex, metallic or non-metallic . . . . . 4  
 Hind tibiae dark metallic green, with the apical one-fifth or one-sixth, or at least the extreme tip, paler, non-metallic . . . . . 3
3. Entire mesonotum (mid lobe, parapsides, axillae, and scutellum) with rather fine reticulation, the pattern strongly raised; mid keels of propodaeum basally contiguous; size over 2 mm. . . . . *illustris*, sp. n.  
 Mesonotum with coarse raised reticulation on base of mid lobe, smoother at sides of apex and base of scutellum in middle, keels well apart at base, brilliant green.  $1\frac{3}{4}$  mm. . . . . *neavei*, sp. n.  
 Only the tip of the tibia pale, larger (2 mm.) and slightly duller . . . . . *neavei*, var.
4. Small species; ♀ not more than 1.25 mm. . . . . 5  
 Larger species; ♀ 1.35–1.75 mm., more stoutly built . . . . . 6
5. Hind tibiae translucent brown, in some specimens faintly metallic; antero-median scutellar surface smooth in both sexes . . . . . *telenomi*, Crawf.  
 Hind tibiae darker, with blue reflections; antero-median scutellar surface smooth in female, raised in male . . . . . *violacea*, sp. n.
6. Entirely shining black, but not metallic, save occasionally on funicle and hind legs; head very broad, malar space reduced, truncate; lateral keels delicate . . . . . *africana*, sp. n.  
 More or less extensively metallic on head and thorax; lateral keels normal . . . . . 7
7. Mid region of scutellum gleaming from base to apex . . . . . 9  
 Mid region of scutellum posteriorly with raised pattern. . . . . 8
8. Pattern of scutellum entirely coarse and raised, outer tooth of mandible distinctly smaller than the inner, whose edge is simple . . . . . *mediopunctata*, sp. n.

- Scutellum in the middle anteriorly smooth, reticulate, not raised, pattern finer; mandibular teeth subequal, inner edge apically serrate . . . . . *homoea*, sp. n.
9. Pre-apical hollows of propodaeal peduncle shining; mesonotal sculpture coarse; vertex reticulate . . . . . *nigripes*, sp. n.
- Pre-apical hollows dull; mesonotal sculpture fine; vertex smooth . . . . . *amaurocoela*, sp. n.

**Pleurotropis neavei**, sp. nov. (figs. 1, 2, 5, 9).

♀.—*Head* broader than thorax (5 : 4), much broader than long (5 : 2), the length being measured across the vertex; occiput very concave, the edge sharp. Eyes large, densely clothed with whitish pubescence; malar space distinct, triangular. Frons slightly prominent at the base line of the eyes, just above which the antennae are set; vertex coarsely reticulate, seen from above shining green. Posterior ocelli about twice as far from one another as from the ocular edge. Behind the posterior ocelli the vertex is a little excavated and smoothed towards the postero-lateral angle of the occiput, but the reticulation reappears just before the occiput is reached. Occiput sharply defined, surface down to the neck (facing the prothorax) dull, reticulate, dark purple. Frons coarsely reticulate to below the anterior ocellus (which divides a line drawn from the apex of either scape to the opposite posterior ocellus), and concolorous with the vertex; its surface up to this point flat or slightly convex, but below the anterior ocellus the face is hollowed, consisting of two inclined finely reticulate plates, which unite rather indistinctly in the middle, but with clear sutures above from the anterior ocellus to the upper margin of the eye; the face here has aeneous reflections, but from in front is dark green; the lower mid line of the frons and the clypeus, which is gently concave on the oral edge, is smooth. Above the middle of the frons the orbits are subparallel, but they diverge both towards the occiput and the genae. All the frons wide, the shortest distance between the eyes being  $\frac{1}{3}$ — $\frac{1}{2}$  greater than the width of the eye seen from the same aspect. Genae duller, with short pubescence, at most showing a faint, purplish reflection. On the occipital edge 4 bristles, viz., a median pair with one on each side aligned after an interval with a row of five bristles, which fringe the orbit, the last of this row standing at the level of the apex of the scape; below this on each side a row of 5–6 minute bristles; across the clypeus, above the mouth edge, 6 bristles (3, 3) and a pair below the scrobes; a single hair behind the anterior ocellus and one inside each of the posterior ocelli; between the ocellar triangle and the apices of the scapes two pairs of lateral medianly convergent bristles.

*Antennae* eight-jointed (fig. 2, b): scape, pedicel, one ring joint, three funicular and two in the club—the last with a terminal spur. Scape slender, five times as long as broad, on ventral edge 6–7 hairs, dorsally about three. Pedicel about twice as long as broad, shorter than first funicular joint. Ring joint very small; under a high power, apparently consisting of at least two laminae, closely appressed. The funicular joints, especially the second and third, pedunculate anteriorly, first longest, second and third decreasing slightly; first joint of club much bigger than the second. Joints 4–8 show three kinds of structure: (a) long scattered hairs, (b) short mushroom-like

hairs, and (c) "sensory" grooves, giving rise to clear narrow blade-like pieces of chitin. Entire antennae dark shining metallic green, hairs whitish. Length, .6 mm.

*Mouth-parts*: mandibles (fig. 5, b) triangular, bidentate, outer tooth slightly sharper and longer, inner edge of the second serrate near apex, 3-4 hairs on outside. Stipes dense and black; one hair behind the maxillary palpi; galea with about seven hairs, mainly towards the apex. Both palpi one-jointed, the labial long, three-fourths of the maxillary, with the usual long terminal bristle and another median or sub-basal.

*Thorax* shining green, the sternal area similar, but darker. *Prothorax* entirely shining and smooth, brilliant green, with a suggestion of blue, with six strong pale bristles (3, 3) on the anterior edge, which is sharply defined; these bristles extend to the bend of the parapsidal furrows. *Mesonotum* with the parapsidal furrows distinct; mid lobe coarsely reticulate anteriorly in the centre, the pattern raised and extending to the suture, the sides anteriorly still reticulate but not raised, the

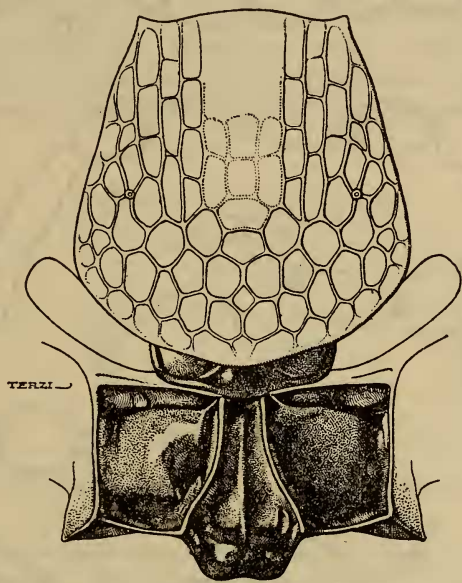


Fig. 1. *Pleurotropis neavei*, sp. n.; scutellum, metanotum and propodeum.

reticulations becoming drawn out towards the apex (*i.e.*, posteriorly). On each side towards the furrows is a dimpled or depressed, smooth, setigerous area; besides these two bristles the mid lobe bears a pair anteriorly. Lateral lobes smooth and shining—in reality finely reticulate, but not with raised pattern—with two bristles, one before the axilla and one at the anterior angle. Axillae with one bristle, invading parapsides somewhat deeply, and with a similar surface. *Scutellum* (fig. 1) with two bristles; anterior median area smooth, with ridges or furrows on each side; posteriorly the furrows are more and more distinctly crossed by transverse ridges, till the whole hind area is reticulate. *Metanotum* narrow, mid portion green, shining, smooth; sides dull purplish and depressed. *Propodeum* (fig. 1) large, entirely smooth

and shining, with two short angular projections and ashort neck for the reception of the petiole. Entire posterior edge ridged; two median and two lateral keels, the spiracles outside the latter. At the metanotal suture the median keels are from one another about one-seventh of the distance between the laterals, but posteriorly they diverge considerably, till at the posterior edge they are apart over one-third the

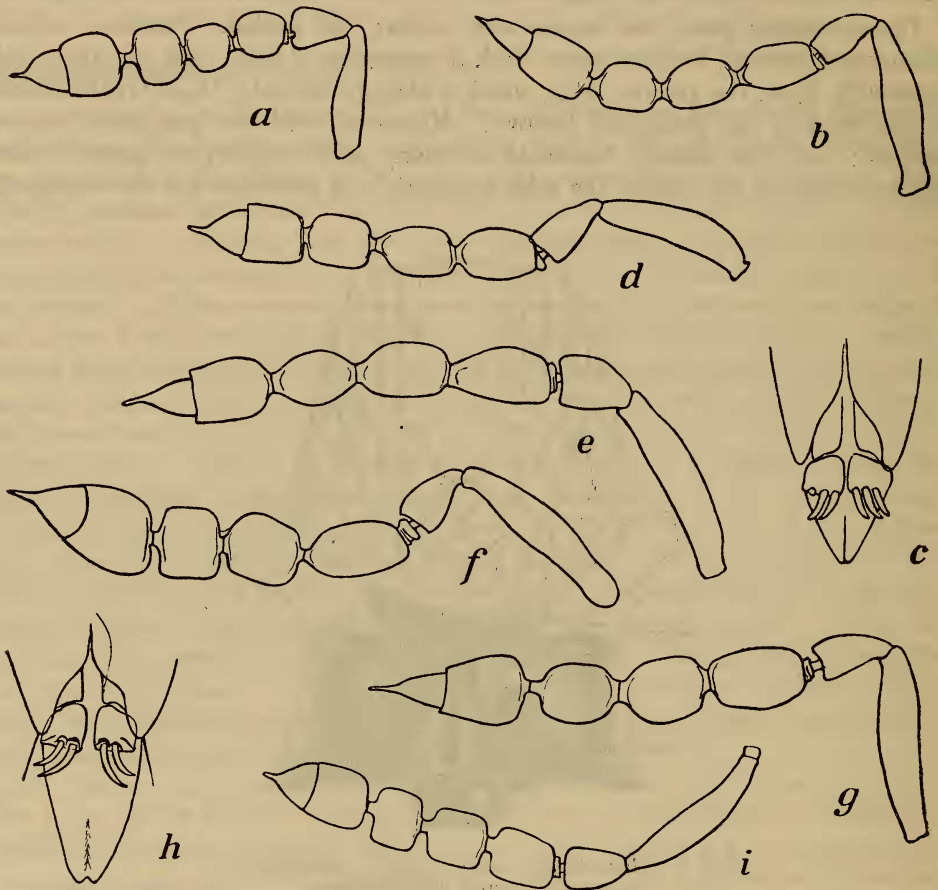


Fig. 2. *a*, antenna of *Pleurotropis africana*, ♀; *b*, antenna of *P. neavei*, ♀; *c*, genitalia of *P. neavei*, ♂; *d*, antenna of *P. clinognathus*, ♀; *e*, antenna of *P. mediopunctata*, ♀; *f*, antenna of *P. homoea*, ♀; *g*, antenna of *P. nigripes*, ♀; *h*, genitalia of *P. nigripes*, ♂; *i*, antenna of *P. amaurocoela*, ♀.

distance between the lateral keels. An area is thus enclosed in which there rises a slight median keel, flanked by two hollows separated slightly from one another. The short stalk of the propodaeum is at first a little depressed, then raised. Thus, the keel or ridge separating the hollows fails before the extreme apex of the propodaeum. Stigma oval, rimmed (fig. 9, *a*); pleurae shining green, reticulate.

*Wings*: fore wings with the marginal long, more than twice the length of the submarginal; radius nearly sessile, with four cells, shorter than the post-marginal. Length, 1.2 mm.; breadth, .6 mm. Hind wings with cilia rather long. Length, 1 mm.; breadth, 2.5 mm.

*Legs*: fore legs with the coxae triangular, moderately swollen, reflexed apically on outside; femur slightly swollen, with 10–12 ventral bristles, of which the last (subapical) is longest; tibia as long as the femur, with two apical ventral spurs; the first three joints of the tarsus subequal, the last to tip of claw double its predecessors (see table below). Entire leg to near the tip of tibia black, with metallic green reflections, apex paler, non-metallic; in cleared preparations the knees are also narrowly pale, but this cannot be seen in carded examples; first three tarsal joints pale, fourth darker, especially towards the tip. Mid legs slender, coxae with no apical reflection; femur with three basal ventral bristles, bare thence till near the apex, where there is a single long bristle above the ventral edge; tibia longer than femur, with a strong apical ventral flat spine, which is as long as the first tarsal joint. Mid leg coloured like the first, but the tip of the femur is more extensively pale, and the apex of the tibia also. Hind legs with the coxae large, swollen; femur equal to the tibia, with about eight very short ventral bristles and one long subapical; apical bristle of tibia stout, the extreme tip dark, nearly half as long again as first tarsal joint.

*Proportions of Tarsal Joints.*

	i.	ii.	iii.	iv.
Fore .. ..	20	22	22	44
Mid .. ..	46	30	25	45
Hind .. ..	30	30	30	50

Measurements made from base of joint along dorsal edge to the base of succeeding joint.

*Abdomen* with the petiole moderate, with lateral keels above and below, the surface punctate and dull purplish. First tergite occupying rather more than half of the visible surface of the abdomen, shining blue green on the posterior edge and elsewhere, except on the postero-median half, which is dull purple and coarsely reticulate. The remaining tergites have the same dull purple lustre except before the suture, where they are shining blue green. Abdomen generally depressed above slightly carinate below, basally ovate and terminally pointed. Ovipositor not projecting; free portion of sheath one-tenth of the base. The first tergite is practically bare, but behind it the segments are clothed with soft whitish hairs, set mainly at the sides, there being a median posteriorly contracting glabrous area.

*Length*, 1.62 mm.; alar expanse, nearly 3 mm.

♂.—I am not able to describe this sex in detail, as only fragments of one specimen are available. It appears to be smaller and stouter in build, with a bronzy tint over the prevailing metallic green. Antennae barely .6 mm.; scape shorter and more

expanded than in the ♀; sensory channels less elongate, almost rounded; pedicel longer than first funicular joint; joints of the funicle subequal, decreasing slightly, bead-like, with longer stalks. No subapical ventral bristle on hind tibia.

*Proportions of Tarsal Joints.*

	1.	ii.	iii.	iv.
Fore .. .. .	15	25	20	30
Mid .. .. .	35	25	20	45
Hind .. .. .	25	30	30	45

NYASALAND: Mt. Mlanje, 3. vii. 13 (*S. A. Neave*).

*Holotype*—a ♀.

A series of eight females was bred by Mr. Neave from the pupa of a butterfly (*Charaxes* sp.). The insect is not improbably a hyperparasite on some species of *Chalcis*.

*P. neavei* is apparently a close ally of *P. howardi*, Crawford (Bull. U.S. Dept. Agric., Tech. Ser. no. 19, pt. ii, p. 23), but differs in the smaller size (less than  $1\frac{3}{4}$  to 2 mm.) and the apically pale posterior tibiae.

#### **Pleurotropis neavei**, var.

♀.—The mandibles are essentially as in the type, and the differences in sculpture (slightly coarser) are such as might be expected with the greater size. *Length*, 2 mm.; alar expanse, over 3 mm.

GERMAN EAST AFRICA: Bukoba, 2 ♀ ♀ from cocoons of *Apanteles* sp., 10. vi. 12 (*C. C. Gowdey*).

#### **Pleurotropis clinognathus**, sp. nov. (figs. 2, 3, 4, 5, 9).

A purplish black species, with blue-black or purple reflections.

♀.—*Head*: eyes rather sparsely haired; vertex and frons indistinctly reticulate except on the ocellar triangle; from the ocelli to the suture the frons is shining blue-black, while below, on the area subtended by the scapes, the surface is distinctly though finely reticulate and dull purple in colour. Clypeus shining. Mandibles relatively large (fig. 5, *e*), protruding from the mouth and easily visible, bidentate, falcate, the outer edge long and curved, the outer tooth long and sharp, the inner small.

*Antennae* (fig. 2, *d*) hardly anywhere metallic; in transmitted light, the scape, pedicel and eighth joint, even when unmounted, are translucent; the other joints are dark, with blue reflections. Pedicel equal to the first funicular joint. Length, .55 mm.

*Thorax*: mid lobe of *mesonotum* with a very coarse raised reticulation. Parapsidal furrows after the bend exceedingly hard to see, but from the bend there is a prominent ridge on each side of the apex of the mid lobe running *inside* the depressed setigerous area and making a narrow abscissa on the scutellar suture. These ridges, however, are not true parapsides, but rise as the meeting lines between



the dissimilar sculpturing of the depressed area and the mid apex of the mid lobe. The depressed area is thus dull (smooth and shining in *neavei*) and the bristle rises from a raised base. *Scutellum* (fig. 3) nowhere smooth, but more shining than the mid lobe; pattern slightly raised and longitudinally drawn out. *Axillae* dull, finely reticulate. *Propodaeum* (fig. 3) with the median keels nearer one another than in *neavei*, one-eighth the distance between the lateral keels, no raised portion or ridge enclosed; near the short neck the central keels diverge slightly, enclosing two hollows. Lateral keels subparallel and short, the short projection behind each being rounded, not pointed. Spiracular area outside the keels narrowed (fig. 9, b).

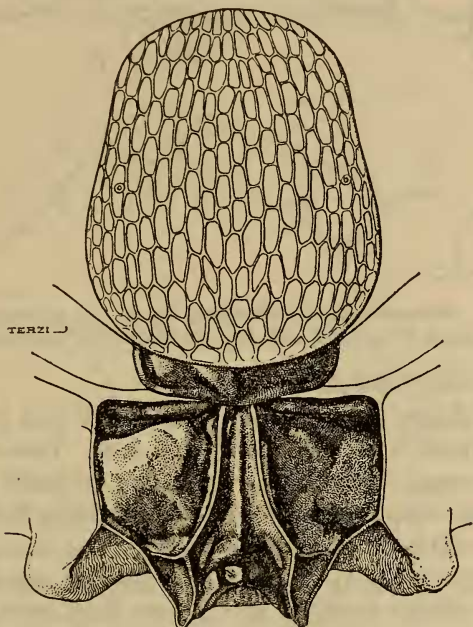


Fig. 3. *Pleurotropis clinognathus*, sp. n.; scutellum, metasternum and propodaeum.

*Wings* tinged with clear brown.

*Legs*: all the coxae and femora, except the tips of the posterior pairs, dark, but almost without reflections; all the tarsi pale translucent, fuscous or brown, the last joint neither wholly nor partly black; fore and mid tibiae dark to beyond the basal half, paler thereafter; hind tibiae nearly uniformly pale. Spur longer than the first tarsal joint.

*Proportions of Tarsal Joints.*

	i.	ii.	iii.	iv.
Fore .. ..	15	25	20	40
Mid .. ..	35	35	20	40
Hind .. ..	25	40	30	40

*Abdomen*: first tergite covering half the visible surface, entirely shining, dark bluish green; tergites 2-4 subequal, 5 twice as long as 4, 6 a little longer than 4. All these tergites purplish and shining, being so little striate or punctate that there is no interference with the light reflection. Free portion of sheath one-sixth of the base.

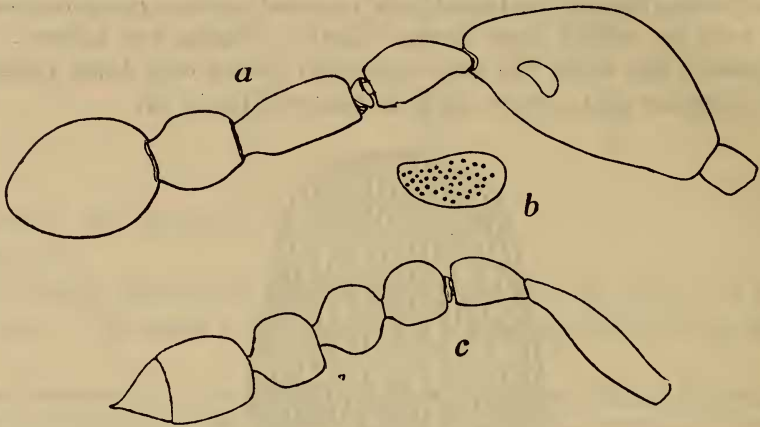


Fig. 4. *Pleurotropis clinognathus*, sp. n.; a, antenna of ♂; b, sense-organ on antenna of ♂; c, antenna of *P. telenomi*, Crwf.

*Length*, 1.37 mm.; alar expanse, 2.75 mm.

♂.—*Head*: The ♂ differs conspicuously from the ♀ and from the ♂♂ of the other species now described in the antennae (fig. 4, a, b). These are apparently composed of six joints; scape, pedicel, ring joint, two funicular and one club. The scape is extremely thick, deep and swollen, the length being to the breadth as 8:5. Pedicel normal, five-twelfths of the scape in length. First funicular joint cylindrical, longer (7:5) and narrower (3:4) than the more globose second joint. Club joint single, swollen, oval, without terminal spur, longer than broad (4:3) and shorter than the sum of the funicular joints (2:3). The whole antenna is bristly (except the sparsely clad pedicel), and the scape, besides being covered dorsally with a coarse raised reticulation, bears near the apex a perforated oval plate. Length of antenna, .48 mm. The eyes are distinctly hairy.

*Wings*: the forewings, as compared with those of the ♀, are much less robust and shorter.

*Legs* rather stronger and possibly more metallic on the femora.

*Thorax*: in the mid lobe of the mesothorax the ridge inside the parapsidal furrows is fainter posteriorly. The cells on the scutellum a trifle wider, especially posteriorly.

*Abdomen*: the first visible tergite covers one-half of the whole surface.

*Length*, 1.37 mm.; alar expanse, 1.8 mm.

SOUTHERN NIGERIA: Ibadan, 50 ♀♀, bred from unrecorded host, emerged 2. ii. 14 (Dr. W. A. Lamborn).

GOLD COAST: Aburi, 7 ♂♂ and 37 ♀♀ bred from horned wasp (*Synagris cornuta*, F.), and 1 ♂ and 43 ♀♀, presumably from the same host, 1912-13 (W. A. Patterson).

*Holotype*—a ♀ from Ibadan.

**Pleurotropis nigripes**, sp. nov. (figs. 2, 5, 6, 7, 9).

Dark shining green on head, thorax and base of first abdominal segment, remainder of abdomen and pleurae blue or purplish.

♀.—*Head* (fig. 7, b): sculpture of the vertex distinct, though not so pronounced or raised as on the thorax, agreeing in this respect with *P. clinognathus*. The hollows behind the posterior ocelli distinct, smooth extensively towards the eye margins; reticulation most distinct within the ocellar triangle. Eyes almost bare, the pubescence short and sparse. Mandibles not deeply bidentate (fig. 5, f), inner tooth broader, with its inner edge shortly serrate at the apex. *Antennae* entirely dark and metallic, pedicel short, first joint of funicle longest and broadest. Length, .68 mm.

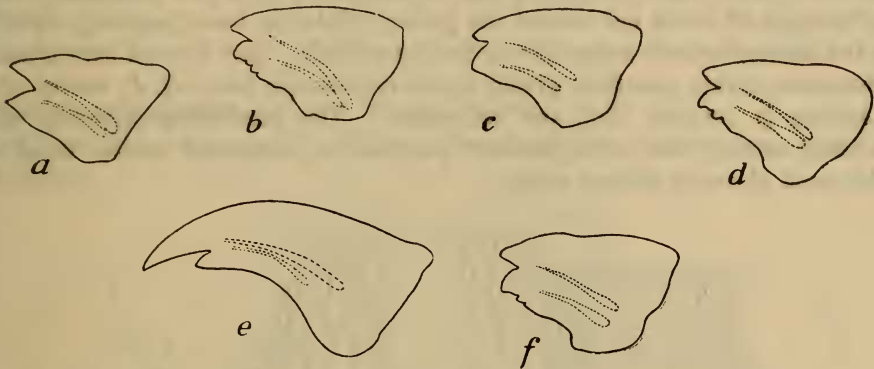


Fig. 5. Mandibles of:—a, *Pleurotropis africana*; b, *P. neavei*; c, *P. mediopunctata*; d, *P. homoea*; e, *P. clinognathus*; f, *P. nigripes*, spp. n.

*Thorax*: *pronotum* smooth and shining, but behind the anterior ridged edge are numerous very short subparallel ridges not reaching beyond one-third backwards; they are imperceptible separately save in a good light, but their effect is to make the anterior edge duller. *Mesonotum* with the mid lobe rather coarsely reticulate to the level of the posterior (apical) pair of bristles, the pattern being raised. From the bristles to the scutellum the apex of the mid lobe is striate, only the longitudinal lines of the reticulate pattern being raised. Before the scutellum the furrows are rather deeply marked for a short distance. Lateral lobes and axillae mainly striate-reticulate. *Scutellum* antero-medially smooth, shining and impunctate, as in *P. neavei*, but less broadly so ( $\frac{1}{3}$  as opposed to  $\frac{1}{2}$ ) with about five ridges on each side. The smooth median area continues to the metanotum, before which there is at most a weak striation with feeble reticulation. The posterior third is not, as in *P. neavei*, raised again into a bold pattern. *Propodaeum* narrower than in *P. neavei*, the posterior knob broad; within the median keels is a secondary central keel running the whole length of the enclosed space; distally on both sides the preapical hollows are shining.

*Wings*: fore wings apically rounded; length 1.2 mm.; breadth, .55 mm. hind wings, length, .95 mm.; breadth, .25 mm.

*Legs* : from the coxae to the tip of the tibiae all three pairs black and metallic ; the last joint of all the tarsi wholly black, the other three clear white. The apical spur of the mid tibia is hardly as long as the first tarsal joint.

*Proportions of Tarsal Joints.*

	i.	ii.	iii.	iv.
Fore .. .. .	24	25	20	45
Mid .. .. .	50	30	30	45
Hind .. .. .	40	40	30	50

*Abdomen* : first tergite occupying half the surface, with a dim triangular median area, the apex of which lies behind the petiole, while the base (narrowly separated from the suture) extends across the median two-thirds. This dimmer area is caused by numerous minute punctures giving rise to microscopic hairs (*cf. P. neavei*, where the surface is actually dull and reticulate). The succeeding segments show, (a) a basal shining belt, (b) a minutely punctate or roughened median band, and (c) the usual gleaming sutural edging.

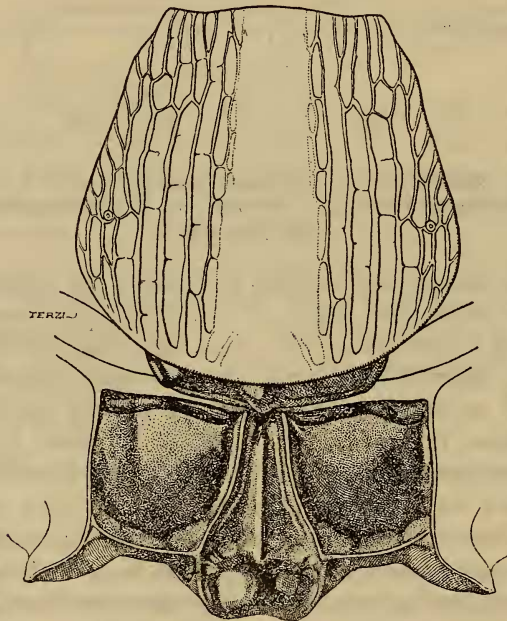


Fig. 5. *Pleurotropis nigripes*, sp. n. ; scutellum, metanotum and propodeum.

*Length*, 1.5 mm. ; alar expanse, 3 mm.

♂.—*Antennae* with the pedicel less than two-thirds of the first funicular joint. Joints of funicle decreasing ; club long, with equal joints. *Length*, .7 mm.

*Wings* : fore wings very truncate at apex ; *length*, .97 mm. ; *breadth*, .48 mm. Hind wings, *length*, .88 mm. ; *breadth*, .20 mm.

*Proportions of Tarsal Joints.*

	i.	ii.	iii.	iv.
Fore .. .. .	20	25	20	40
Mid .. .. .	40	30	25	40
Hind .. .. .	35	35	25	40

The apical hind tibial spine distinctly longer than the first tarsal joint.

SOUTHERN NIGERIA: Ibadan, 2 ♂♂ and 8 ♀♀, bred, along with an undetermined *Eurytoma* sp., from cocoons of an undetermined Braconid, vii. 1913 (*Dr. W. A. Lamborn*).

*Holotype*—a ♀.

***Pleurotropis amaurocoela***, sp. nov. (figs. 2, 7, 8, 9).

Similar to *P. nigripes*, from which it differs mainly in the antennae, vertex and propodaeum.

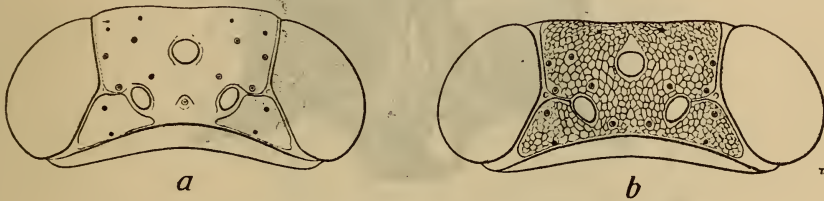


Fig. 7. Heads of:—*a*, *Pleurotropis amaurocoela*, sp. n.;  
*b*, *P. nigripes*, sp. n.

♀.—*Head* (fig. 7, *a*): eyes distinctly but not densely hairy (almost bare in *P. nigripes* and *homoea*). Vertex and frons to the suture smooth and gleaming, the surface hardly disturbed, except along the edge of the occiput, in the middle, behind the ocellar triangle. The space between the anterior ocellus and the apices of the scapes is shining dark blue green. In *nigripes* the corresponding area is furrowed or raised reticulate, dark green, and only a little less rough in *homoea*.

*Antennae* short, compact, shining dark blue; funicular joints thick, the first slightly longest (fig. 2, *i*). Length, .55 mm.

*Thorax*: *mesonotum* green, with purple reflections near the suture. Mid lobe with moderately fine reticulation, hardly at all raised (coarse and raised in *nigripes*), and drawn out towards the apex, at the side of which are two setigerous foveolae, the setae being on a slightly raised base. Over these hollows is a dull purplish tinge. *Scutellum* (fig. 8) with the median area (over one-third) bright shining green throughout; at the sides the reticulate pattern long drawn out. *Propodaeum* (fig. 8) with the central keels widely apart at base and a weak median keel within, preapical hollows dull purplish in contrast to the brilliant green of the rest of the surface.

*Abdomen* with the first abdominal tergite rather more extensive than in *nigripes*, shining green at the sides and base; the rest purple, equally smooth. With eyepiece v. and objective *a* no hairs can be differentiated on the purple surface, whereas in *nigripes* with the same power they are apparent.

*Length*, 1.5 mm.; alar expanse, over 3 mm.

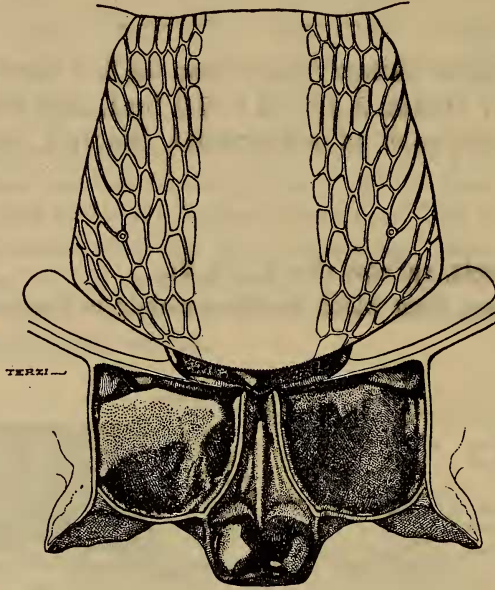


Fig. 8. *Pleurotropis amaurocoela*, sp. n.; scutellum, metanotum and propodeum.

EGYPT: Cairo, 1 ♀, bred (along with a Pteromalid) from a microlepidopterous larva (*Pyroderces simplex*, Wlsm.) in cotton bolls (*W. Draper*—Brit. Mus.).

NORTHERN NIGERIA: Aguji, Ilorin Province, 3 ♂♂ and 6 ♀♀, bred from cocoons of a Braconid (*Apanteles* sp.) parasitic on the cotton leaf-roller (*Sylepta derogata*, F.), 18.ix.13 (*Thos. Thornton*).

NYASALAND: Dedza, 2 ♀♀, bred with *Tetrastrichus* sp., from *Sylepta derogata* (*E. Ballard*).

*Holotype*—a ♀ from Dedza.

***Pleurotropis homoea***, sp. nov. (figs. 2, 5, 9, 10).

Closest to *P. nigripes*, but separated from it by size, colour, sculpture of thorax, etc. A larger duller insect; the metallic reflections on the head and thorax very dark green; abdomen practically black, with blue and purple reflections.

♀.—*Head* smoother on the vertex, eyes bare. *Antennae* (fig. 2, *f*) with the joints of the funicle increasing in width abruptly (hardly at all in *nigripes*). *Length*, .67 mm.

*Wings* : fore wings, length, 1·15 mm. ; breadth, ·55 mm. Hind wings, length, 1 mm. ; breadth, ·25 mm.

*Thorax* : mid lobe of *mesonotum* more finely reticulate, with foveolae before the suture, the reticulation at the apex not drawn out into ridges. Mid anterior area of *scutellum* (fig. 10) finely reticulate, but hardly at all raised ; at the sides anteriorly the cells of the network are longer than broad, but the ridges are neither so continuous nor so raised as in *nigripes*. Posteriorly the scutellum is reticulate, while in *nigripes* the smooth area extends to the metanotum. *Propodaeum* (fig. 10) with the median keels

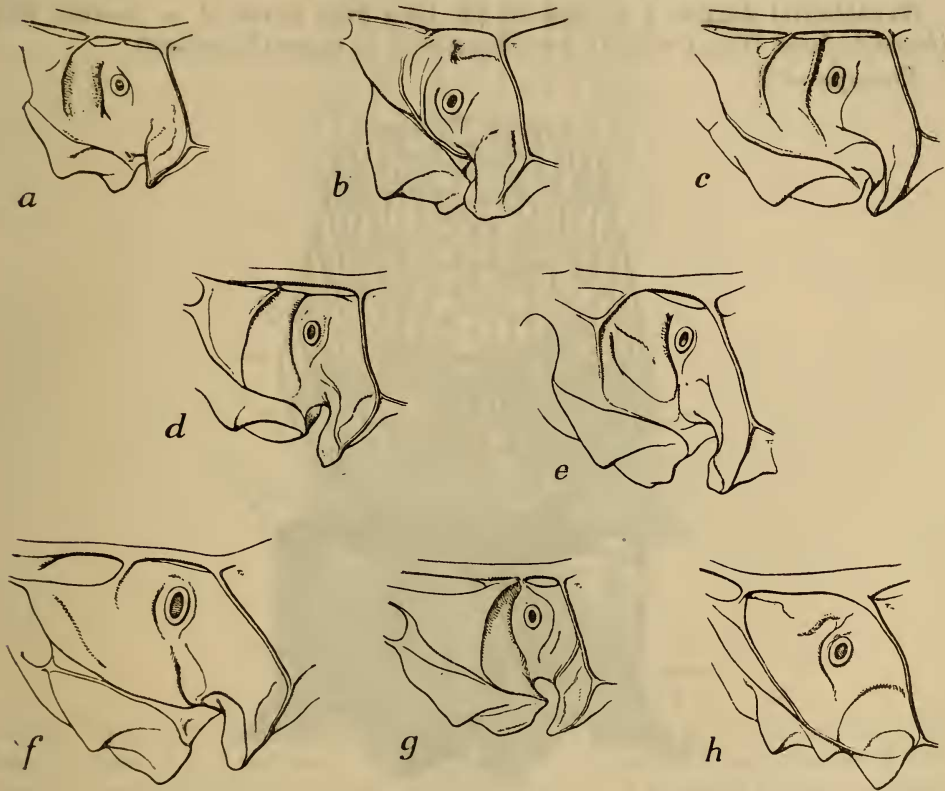


Fig. 9. Pleurae of the propodaeum of:—a, *Pleurotropis neavei*; b, *P. clinognathus*; c, *P. nigripes*; d, *P. amaurocoela*; e, *P. homoea*; f, *P. mediopunctata*; g, *P. africana*; h, *P. illustris*.

closer and the excavation before the insertion of the petiole pitted and dull, not smooth and shining as in *nigripes*. In *nigripes* the areas enclosed between the lateral and the median keels are smooth, shining metallic green ; in *homoea* the corresponding areas are much darker, gleaming, obscurely reticulate (though not raised), and next the posterior margin are a number of irregular foveolae which further darken the edge.

*Proportions of Tarsal Joints.*

	i.	ii.	iii.	iv.
Fore .. ..	20	25	20	40
Mid .. ..	40	30	30	40
Hind .. ..	40	40	30	—

*Abdomen* : the first segment occupies at least five-eighths of the exposed surface.

*Length*, 1.75 mm. ; alar expanse, 3 mm.

NYASALAND : Zomba, 2 ♂♂ and 10 ♀♀, bred from larvae of a Noctuid moth (*Busseola fusca*, Hmp.), which is very destructive to maize (*E. Ballard*).

*Holotype*—a ♀.

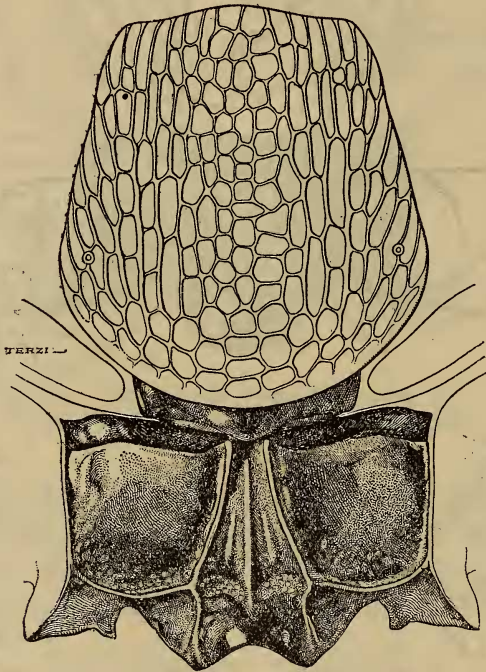


Fig. 10. *Pleurotropis homoea*, sp. n. ; scutellum, metanotum and propodeum.

***Pleurotropis mediopunctata*, sp. nov.** (figs. 2, 5, 9, 11).

Blue-black with metallic reflections, and little green anywhere.

♀.—*Head* with slight greenish reflections on the face, mingled with blue. Reticulation of the head somewhat coarse and raised especially between the ocelli and the apex of the scapes. *Antennae* strongly metallic (fig. 2, e). Length, .68 mm.

*Thorax* : *pronotum* with the shining surface on the anterior half considerably disturbed by hollows and short rugae, so as to appear dim ; the six bristles are darker than usual. *Mesonotum* with the reticulations of the mid lobe much raised, but



the depressed triangular setigerous areas lying one on each side of the apex of the lobe are smooth ; the parapsidal furrows (whose abrupt bending is plainly visible in this species) bounding this smooth spot on the outside, are deepened. *Scutellum* (fig. 11) entirely covered by a raised pattern which anteriorly tends to form ridges, and posteriorly consists of a very coarse reticulation (cf. the same region in *P. neavei*). *Propodaeum* (fig. 11) with the median keels very close together basally, rather more than one-tenth the distance between the laterals ; the enclosed space not carinate, but

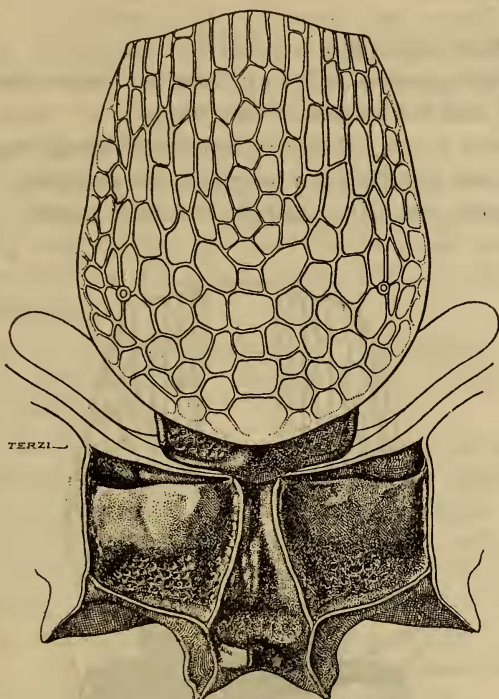


Fig. 11. *Pleurotropis mediopunctata*, sp. n. ;  
scutellum, metanotum and propodaeum.

slightly pitted posteriorly. The area contained by the expanded ends of the keel is deeply hollowed and the cavity is dull, owing to its surface being punctured ; the whole upper posterior edge before the posterior keel is for some distance punctate and dull.

*Wings* : fore wings, length, 1.3 mm. ; breadth, .6 mm. Hind wings, length, 1 mm. ; breadth, .25 mm.

*Proportions of Tarsal Joints.*

	i.	ii.	iii.	iv.
Fore .. ..	25	25	20	40
Mid .. ..	30	35	25	50
Hind .. ..	—	—	—	—

*Abdomen* with the first segment occupying three-fourths of the exposed surface, with a broad, dim, minutely punctate region bearing microscopic hairs; the base of this dim area extends practically across the suture. Anteriorly and at the sides, gleaming metallic blue-green; the remaining segments considerably telescoped, shining black.

*Length*, 1.6 mm.; alar expanse, 3 mm.

SOUTHERN NIGERIA: Ibadan, 4 ♀♀, bred from pupa of a Coccinellid beetle, vii. 1913 (Dr. W. A. Lamborn).

***Pleurotropis africana*, sp. nov.** (figs. 2, 5, 9, 12).

A broad-headed black species, differing from the others described in the weak lateral keels of the ♀, and the reduced malar space.

♀.—*Head* black, with a purplish lustre, extremely broad, much broader than the thorax at its widest and equalling the length of the abdomen. Vertex rather long, with the face moderately reticulate, the pattern hardly raised. Eye large, extending

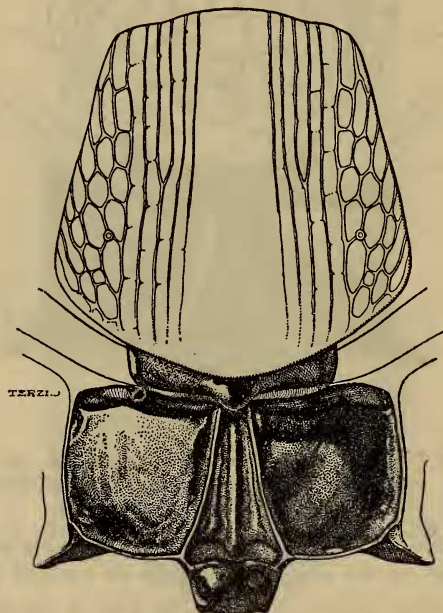


Fig. 12. *Pleurotropis africana*, sp. n.; scutellum, metanotum and propodeum.

almost to the mandibles and narrowed ventrally; thus the malar space is practically absent, but the genae are correspondingly increased. Mandibles (fig. 5, *a*) deeply cleft into two equal teeth, the edge of the inner of which is not serrate.

*Antennae* (fig. 2, *a*) with the joints of the funicle remarkably bead-like, subequal—the middle one, if any, the shortest—broadening distinctly towards the club, joint six being broader than long; all joints strongly shining, dark metallic green. Length, barely .5 mm.

*Thorax* with the *pronotum* gleaming posteriorly, anterior half reticulated and dull, hairs dark. *Mesonotum* with the mid lobe reticulate, the pattern being drawn out towards the apex; parapsidal furrows rather deep, no depressed differently sculptured side areas at the apex of the lobe, but in their place, almost on the furrows, a rather deep, elongate fovea; apex distinctly emarginate; parapsides striate, reticulate. Axillae and side of scutellum not dull, but reticulate and gleaming like the rest of the thoracic surface. *Scutellum* (fig. 12) smooth on the median third from the base to the apex, with about four longitudinal ridges on each side, between which there are practically no transverse striae. *Propodeum* (fig. 12) broad, very smooth and shining black. Central keels distally wide apart, containing a well defined central ridge and traces of two others. Depressions before the apex small, the knob itself broad and gleaming. Lateral keels delicate, difficult to see from above because of their fine edge and the black colour of their surroundings.

*Abdomen* with the petiole broad and stout; first tergite covering more than one-half, the disc finely reticulate, in most lights punctate, gleaming, sutural margin broad. The following tergites, like the first, show a broad smooth shining suture with a narrow dull punctate band in front. Rows of hairs on tergites 2-5 continuous and not medianly interrupted.

*Wings*: fore wings very truncate apically; submarginal half the marginal, radius almost sessile, with four cells. Length, 1 mm.; breadth, .52 mm. Hind wings, length, .85; breadth, .25.

*Legs* generally heavier than in the other species, the coxae especially being more swollen and proportionally larger. All are black to the apices of the tibiae, any paleness of the knees demonstrable only in cleared specimens. Fore legs with the last (pre-apical) bristle of the ventral row long and stout, not similar to the others of the row, as it is in *P. neavei*; fourth tarsal joint two and one-third times joint 3, entirely darkened; the others are pale, though 2 and 3 are slightly infuscated. Mid legs with even the head of the femur dark; apical spur reaching middle of tarsal joint. Hind legs with the tibia considerably flattened; apical bristle very stout, dark at tip and equal to the first two tarsal joints.

*Proportions of Tarsal Joints.*

	i.	ii.	iii.	iv.
Fore .. .. .	15	15	15	35
Mid .. .. .	24	20	20	40
Hind .. .. .	25	25	20	45

*Length*, 1.27 mm.; alar expanse, 2.5 mm.

♂.—Very different in colour from the ♀, being bright cupreous or bronzy all over. The metallic green on the antennae is thus masked, but it reappears on the hind femora.

*Antennae* with the funicular joints not broadened towards the apex; all practically of the same diameter. *Scutellum* with a reticulate pattern on the median area and

the longitudinal ridges bolder than in the ♀. *Propodaeum* with the lateral keels distinct; spiracle large. *Abdomen* with the petiole longer than in the ♀ and very stout; first tergite more extensive.

*Length*, 1.25 mm.; alar expanse, barely 2.5 mm.

NYASALAND: Zomba, 2 ♂♂ and 12 ♀♀, bred, along with ♂♂ of a Eupelmine and a ♀ Scelionid from eggs of a Hemipteron (?) (*E. Ballard*).

*Holotype*—a ♀.

**Pleurotropis violaceus**, sp. nov.

A small deep blue species nearest to *P. telenomi*, Crawf. (1911), from Uganda, but slightly larger, darker and more metallic.

♀.—*Head* with the vertex and frons shining blue-black, obscurely reticulate. *Thorax* coloured like the vertex. Mesonotum evenly reticulate, the furrows not distinctly marked; apex of mid lobe not so deeply emarginate as in *P. telenomi*. Axillae further apart. Scutellum medianly almost smooth, but even in the centre a masked reticulation can be detected. *Abdomen* violet or blue-black, shining; the first tergite rather more extensive than in *telenomi*. *Legs* blackish brown with blue-black metallic reflections, especially on the hind tibiae.

*Length*, over 1.25 mm.; alar expanse, 2½ mm.

♂.—Bronzy all over. *Head* broad; vertex and frons to suture, metallic blue, entirely raised reticulate. *Antennae* shining metallic blue; funicle joints bead-like, stout, subequal; pedicel about equal to the first funicular joint. *Thorax* with the mesonotum entirely reticulate; the pattern on the scutellum slightly coarser. *Abdomen* blue-green; the first tergite occupying about five-eighths of the surface; smooth, shining, the other segments telescoped. *Legs* stronger than in *telenomi*, dark, shining, metallic blue-black; those of the latter more or less transparent brown with indefinite reflections.

*Length*, nearly 1 mm.; alar expanse, over 2 mm.

NYASALAND: Zomba, 1 ♂ and 1 ♀, bred, with *Tetrastichus* sp., from eggs of a Lymantriid moth (*Heteronygmia leucogyna*, Hmp.), which is very destructive to leaves of mahogany trees, 29. v. 13 (*E. Ballard*).

*Holotype*—a ♂.

**Pleurotropis illustris**, sp. nov. (figs. 9, 13).

A large brilliant green form, with the median keels basally contiguous.

♀.—*Head* broader than thorax; vertex and frons to the scrobes, raised, reticulate, purple and violaceous green; depressed area behind posterior ocelli likewise reticulate. Eye orbit gleaming near the occipital ridge; eyes sparsely haired, their inner frontal edge decidedly concave. Malar space rather short; lower face reticulate and with hardly any metallic reflections.

*Antennae* rather widely separated; the joints cylindrical rather than bead-like, brown, with a greenish metallic gleam up to the end of the funicle.

*Thorax*: mesonotum evenly and rather finely (as regards the mesh) reticulate, the whole pattern boldly raised, brilliant metallic green. Parapsidal furrows distinct anteriorly, and traceable to the suture by varying the position of the insect,

bent rather abruptly (as seems generally the case in *Pleurotropis*) at about the middle of the mid lobe; the latter apically a little emarginate. *Scutellum* (fig. 13) nowhere smooth, all over with the same sculpture and colour as the rest of the mesonotum; sides dull purplish. Dorsal surface of *metanotum* obscurely reticulate and gleaming, sunken side areas shining more brightly; colour green. *Propodaeum* (fig. 13) with the central keels basally contiguous, distally widely divergent and running not to the sides of the posterior neck or peduncle to which the petiole is attached, but to points on the posterior upturned edge, not far from the postero-lateral angle. Neck with no depressions in front and sending back a narrow keel towards the narrowing mid keels; lateral keels parallel, well defined. Spiracular area large (fig. 9, *h*).

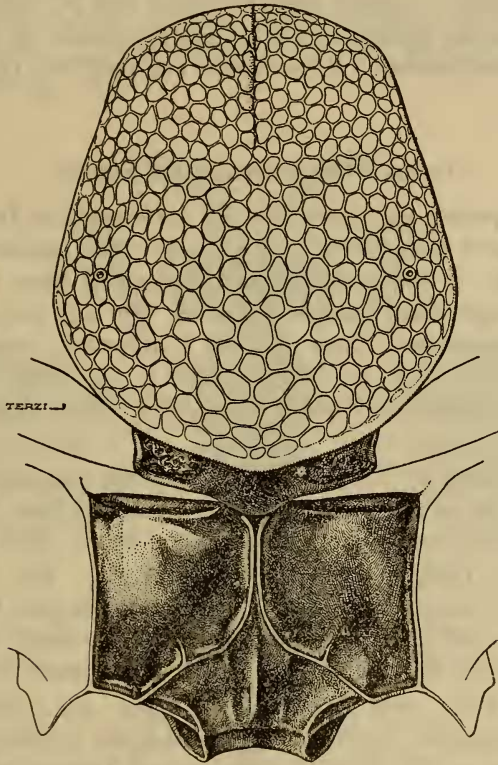


Fig. 13. *Pleurotropis illustris*, sp. n.; scutellum, metanotum and propodaeum.

*Wings*: marginal vein with about 25 fringing bristles, very long, more than twice the length of the submarginal.

*Legs*: all coxae and femora dark metallic green; trochanters non-metallic, paler; all the tibiae, except the apical one-fifth or one-sixth, dark and metallic; tips of fore tibiae brown, non-metallic; tips of mid and hind tibiae white; fore tarsus brown, the last joint darker; hind and mid tarsi white, except the last joint, which is blackish brown.

*Abdomen* with the first tergite entirely shining, deep green with a bluish tinge; occupying one-quarter of the visible surface. Remaining tergites with a moderately broad shining green edge before the suture; the rest of the surface dull purplish and coarsely reticulate. Tergite 6 nearly all reticulate; tergites 3-5 subequal in length, while 1 and 6 are longer and subequal.

*Length*, 2.1 mm.; *alar expanse*, 3.75 mm.

S.W. PERSIA: Ispahan, 1 ♀ (*M. M. Escalera*, Brit. Mus.).

*P. illustris* somewhat resembles *P. eubius*, Walker (*Entedon eubius*, Walker, Mon. Chalcid., i, p. 109, 1839), but it is a smaller insect, differing slightly in the abdomen and legs. Walker also describes a *Pleurotropis obscurella* from the Amur (Cist. Ent. i, pt. 2, p. 320, 1874), which appears to be a true *Pleurotropis*, and, according to the author, it comes near *P. eubius* and *P. caenus*. The wings are "cinereous," so that the species would probably separate off at the beginning of the table with *P. clinognathus*. *P. obscurella* has probably the inner edge of the mandible serrate.

#### Genus SYNTOMOSPHYRUM, Förster.

Dr. G. D. H. Carpenter has forwarded for determination from Uganda a small Eulophid which I have had difficulty in placing. The species falls into the fifth tribe, TETRASTICHINI, of Ashmead's scheme, belonging there to the group which lacks the central longitudinal impressed line on the mid lobe of the mesonotum. Of the genera so characterised three only are in question, viz.:—*Syntomosphyrum*, Först., (Verh. d. naturh. Ver. pr. Rheinl., xxv, p. 60, 1878), *Trichaporus*, Först. (Hym. Stud., ii, p. 84, 1856), and *Tetrastichodes*, Ashm. (Mem. Carneg. Mus., i, no. 4, p. 349, 1904).

*Trichaporus*, as defined by Förster, had no genotype assigned to it, but Ashmead (1904) employed the name in describing three new species from Brazil, placing these at the same time with *Exurus colliguayae*, Philippi (Stett. Ent. Zeit., xxxiv, p. 296, 1873), and rejecting Philippi's genus as a synonym. The African insects are, I believe, generically distinct from the S. American forms, and Dr. R. C. L. Perkins, to whose kindness in looking at some preparations I am much indebted, writes that they have nothing to do with *Trichaporus* as he understands the genus.

*Syntomosphyrum*, Först., and *Tetrastichodes*, Ashm., are probably best separated by the scutellar characters, as there is considerable variation in the antennae. I have not been able to find any full definition of Ashmead's genus, but the two species examined (types) show two sharp median impressed lines (besides the lateral sulci separating the dorsal surface from the sides) on the scutellum. Of his *Syntomosphyrum*, Förster distinctly says: "Das Schildchen hat keine längsfurchen," referring, I take it, to the area *within* the lateral furrows. To this description, the type of *Syntomosphyrum insulare*, Ashm. (Journ. Linn. Soc. Lond. Zool., xxv, p. 181, 1894), from the West Indies, which I have examined, and *S. indicum*, Silvestri (Boll. Lab. Zool. Portici, iv, p. 228-245, 1910), appear to conform. I have accordingly referred the African examples to the same genus. As regards the condition of the scutellum in the West Indian species, I do not feel completely satisfied. *S. insulare*, Ashm., is a very black form, and the fine lines, even if present,

might be demonstrable only in a cleared and mounted specimen. Ashmead (*loc. cit.*) speaks of the scutellum as "smooth, without distinct grooved lines, rarely slightly indicated at the extreme base." Later, he ascribed to *Syntomosphyrum* four scutellar furrows in defining the genus (*Mem. Carneg. Mus.*, i, p. 350, 1904), which is not in accord with Förster's definition. Ashmead's redefinition, however, seems to have gained some acceptance, for Girault (*Mem. Queensld. Mus.*, ii, p. 205, 1913) treats *Neotetrastichus*, Perkins (1912), as a synonym of *Syntomosphyrum*, Först. This can hardly be correct, as Perkins' genus has two central impressed lines on the scutellum.

***Syntomosphyrum glossinae*, sp. nov.** (figs. 14-16).

A species characterised by the bluish black head and thorax, the pale legs, the slightly tinted anterior wings, and the lighter-coloured median basal portion of the abdomen of the ♀. Length, 1.25 mm. (♂), 1.4-1.6 mm. (♀). Alar expanse, 2.3 mm. (♂), 2.5-2.6 mm. (♀).

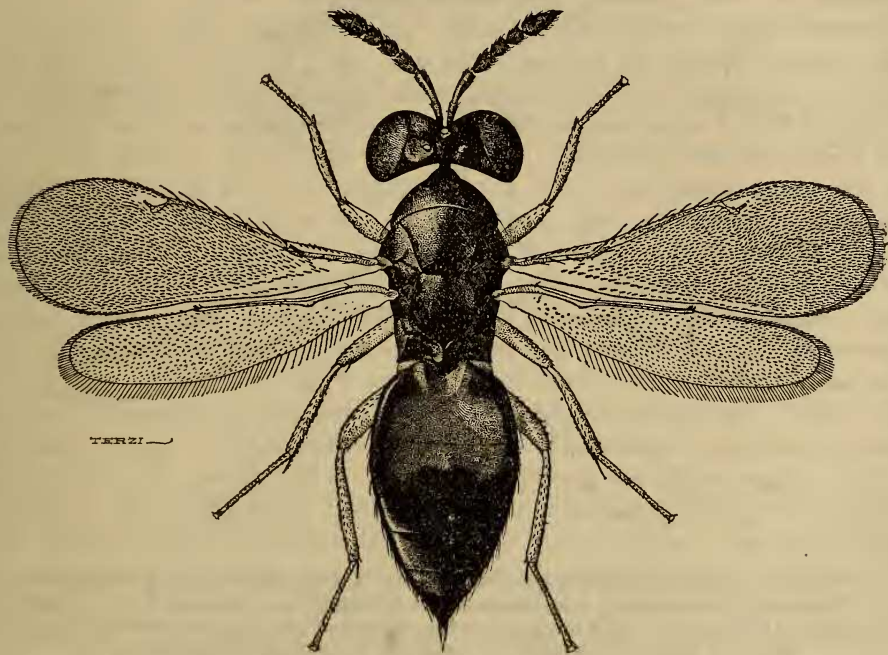


Fig. 14. *Syntomosphyrum glossinae*, sp. n., ♀.

♀.—*Head*, seen from in front, triangular, the occiput sharply defined, very concave behind and slightly so on the frons; reticulate, with hardly any reflections, colour bluish black. Eye large, dark red, bare, but under high magnification ( $\times 600$ ) one or two minute scattered hairs may be detected; greatest diameter less than one-third of the entire face. Scrobes set on the base line of the eyes, rounded oval, outwardly slightly flattened. Malar space distinct; clypeus with two slight furrows outside the scrobes, curving towards one another,

not reaching the mouth edge, which is bilobed; these lobes of the clypeus bear each three bristles, and there are about a dozen, in four rows of three, between the mouth edge and the line of the scrobes.

*Mouth-parts*: mandibles tridentate (fig. 15, *d*), outer tooth sharp and somewhat deeply separated from the inner pair, which are smaller; inner edge of mandible swollen, then contracted. Trophi normal; both maxillary and labial palpi one-jointed. The stipes with one hair before the base of the palpus. Maxillary palpus long, with four bristles, two subapical and two apical, the latter stouter, one of them (the inner) shorter. The labial palpus bears a single terminal bristle, and there is one hair on the mentum between the palpi.

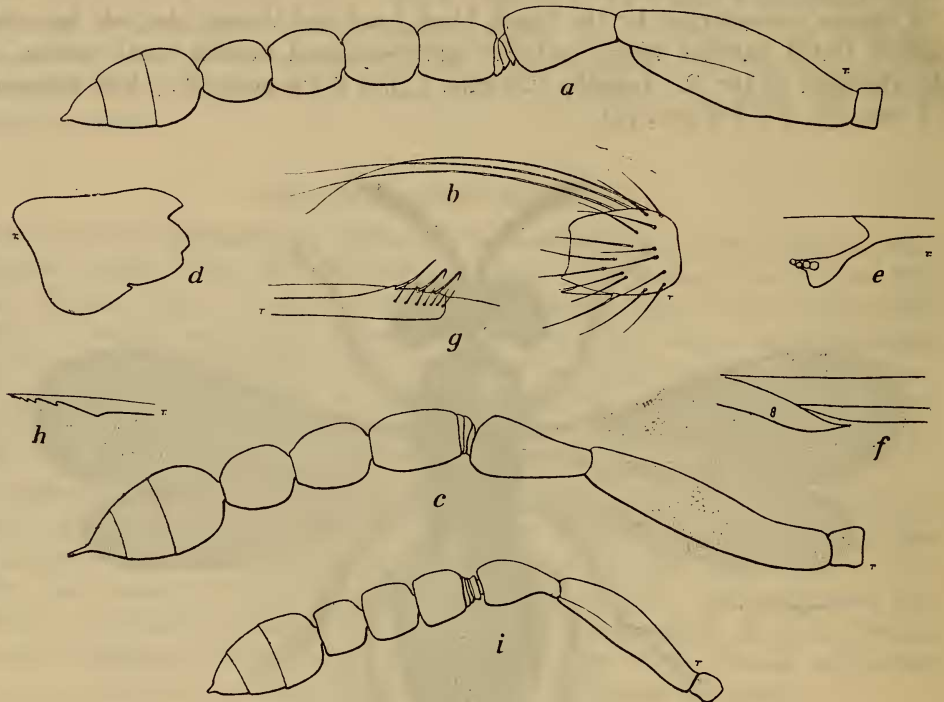


Fig. 15. *Syntomosphyrum glossinae*, sp. n.; *a*, antenna of ♂; *b*, 3rd funicular joint of ♂ (outer side); *c*, antenna of ♀; *d*, mandible; *e*, radius of ♀; *f*, junction of submarginal and marginal veins; *g*, end of marginal vein of hind wing in ♀; *h*, apex of ovipositor; *i*, antenna of *Syntom. phaeosoma*, sp. n.

*Antennae* eleven-jointed (fig. 15, *c*): scape, pedicel, three ring joints, three funicular joints and three to the club; .62 mm. in length. Scape barely one-third of the antennae, slender, four-and-a-half times as long as broad, pale, clothed all over its outer surface with equal short hairs; pedicel barely one-half the scape, long, slightly broader than the scape distally, and a little darker in colour, with about 20 coarser bristles; the second ring joint wedge-shaped in profile. Funicle with diminishing joints (30, 27, 25), the first being cylindrical, and the second and third more bead-like. The club distinctly broader than the funicle, twice as long as broad,



segmented in the proportion of 4:3:3; the apical joint with a spur. In no region is the antenna really black, but the funicle and club are dusky. After the ring joints all the joints bear both hairs and sensory channels surmounted by clear, triangular, chitinous flanges.

*Thorax* black with bluish and even slightly greenish reflections, except on the pronotum, where there is a purplish tinge. *Pronotum* narrow antero-posteriorly and descending roundly towards the occiput and neck, neither elongated anteriorly nor sharply ridged transversely. The whole surface is reticulate, delicately so from the neck to the posterior edge, the pattern becoming coarser towards the sides and reaching its maximum on the pleural flap enveloping the pre-episternite. One strong short bristle above the spiracle on each side, and between these a transverse row of similar bristles (twelve in all), the median pair stronger than the others; the general surface of the pronotum in front of this row with numerous minute hairs, 60 to 70 in all. *Mesonotum* (fig. 16) with the parapsidal furrows complete, straight, wide, deep; two widely separated parallel lateral furrows on the scutellum. No furrow on the mid lobe of the mesonotum, but the mid line in a cleared specimen indefinitely paler. Axillae sharply and extensively produced into the parapsides or lateral lobes. Entire surface evenly reticulate, the pattern being coarser only at the outer edge of the mid lobe. The latter bare on the anterior quarter, with over 30 short bristles behind and one strong bristle before the postero-lateral angle. Lateral lobes with one strong bristle at the postero-lateral angle before the tegula, and some 15 others on the surface. Axillae bare. Scutellum with the lateral lines well-marked, mid lobe with two parallel rows (3, 3) of clear pustules, the first and third setigerous; outer lobes bare. *Metanotum* distinctly developed in three surfaces, viz.:—two smooth and depressed at the sides, with a median broadly pentagonal reticulate area, separated from the sides by ridges. *Propodaeum* well developed, oblong, with straight posterior edge and distinct lateral angles, which do not project beyond the line connecting them and passing through the insertion of the petiole. Apparently flat from above, but really declivous on the posterior quarter and towards the sides from the sharply defined central keel. There is no lateral keel or ridge except near the extreme side, where there is an abrupt descent of the pleura to the insertion of the coxa. The spiracle lies at the anterior angle of the dorsum. The entire upper surface of the propodaeum is bare and reticulate; on the pleurae, above the metacoxae, are three short bristles. The most distinct character of the propodaeum as a whole is that the anterior and posterior and the lateral edges respectively are parallel, save where the posterior edge is excavated for the petiole. The *sternum* of the thorax reticulate; the mesosternum somewhat quadrate with a central ridge; bare; mesopleurae furrowed; mesoprepectus large, triangular, reticulate; sternite divided by a ridge into an upper smooth and a ventral reticulate portion; epimeron bare.

*Wings*: fore wings long and narrow (20:7), shortly ciliated at the edges, widest at a point well beyond the radius. Submarginal a little shorter than the marginal (5:6), with only a trace of the postmarginal; radius moderate, with four cells (fig. 15, e); both marginal and submarginal veins broad and the former only narrowly interrupted; the marginal vein bears seven to eight stout bristles. The whole wing has a faint transparent brown tint. Length, 1 mm.; breadth, .35 mm. Hind wings

long and narrow almost as long as the fore wings; apically much rounded, with fairly long posterior ciliation. Submarginal two-thirds of marginal. Length, .9 mm.; breadth, .2 mm.

*Abdomen* sessile, ovate, terminally pointed, the segments subequal. The extreme base and the sides narrowly to beyond a half, dark, there being a central clear area, broadest on segments 2 and 3. Anal tergite with sessile stylets, giving rise to three long and one short bristle; in front of the stylets the tergite has a row of four to five bristles, and behind them (but mainly within lines drawn posteriorly from the stylets) are sixteen to seventeen bristles; many bristles on the tergite outside the stylets. The sheath of the ovipositor sparingly set with bristles, there being about six on the free distal portion; the saw is here longer than the supporting blades, with several teeth at somewhat long intervals; the free portion of sheath one-third of the base; the tip of the ovipositor (fig. 15. *h*) and the extreme base dark, the rest pale.

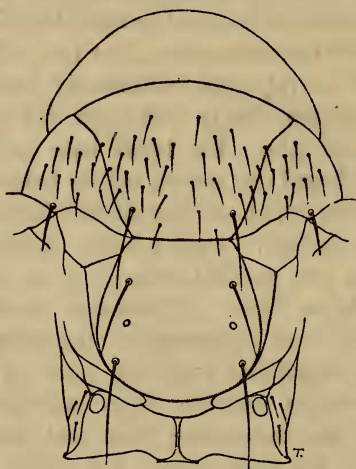


Fig. 16. *Syntomosphyrum glossinae*, sp. n., ♀;  
chaetotaxy of mesonotum.

*Legs* concolorous pale yellowish, only the claws darker; their broader surfaces, e.g., on the coxae and femora, more or less faintly reticulate. *Fore legs* with the coxa pear-shaped, twice as long as broad, with six to seven minute bristles on outer ventral aspect. Femur moderately swollen, nearly thrice as long as broad; both surfaces with numerous minute bristles, and a row of twelve to fourteen on the dorsal edge; the ventral edge bare, save for three to four short bristles near the base; the subapical subventral posterior bristle dark and fairly strong. Tibia very slightly longer than the femur, covered sparsely but evenly with bristles on both sides, and with rows on both edges, two apical ventral bristles and a transverse row (seven) of short hyaline spines on outer aspect. Tarsal joints—17 : 24 : 19 : 30; first joint depressed, thinner on the outer edge, where are seven single bristles on the inferior edge, with two much stronger ones apically; on inner ventral edge about four pairs of stronger bristles; joints 2 to 4 neither depressed nor inequilaterally thinned, with several short bristles on dorsal surface, and three to four (singles or doubles) on ventral aspect. *Mid legs* with the coxae quadrate, longer than broad (4 : 3), with a strong longitudinal

median keel ; the apex obliquely truncate from about two-thirds along the posterior edge to the insertion of the femur ; two bristles on the keel and one at the apex, also three to four short ventral bristles. Femur with one or two basal ventral hairs and thence from base to apex nearly twenty short bristles along the dorsal edge, and several others on surface near the edge, especially towards the upper apical angle ; the rest of the femur bare, except for the usual subapical bristle. Tibia distinctly longer than the femur (5 : 4), covered with short bristles ; one long, ragged bristle at apex continuing the line of the tibia, in length three-tenths of the tibia itself, or three-quarters of the first tarsal joint. The tarsus is nearly equal to the tibia, the proportions of the joints being, 60 : 35 : 25 : 30. *Hind legs* with the coxa long, pear-shaped (17 : 10) ; on the inner surface near apex two fine bristles, a stronger one on the upper surface at about the same position, two apical bristles and one to two ventral. Femur shorter than tibia ; nine to ten ventral or subventral bristles and a closer row on dorsal edge ; about a dozen others, mainly on outer apical surface. Tibia densely clothed with bristles ; the subapical spine strong, equal to two-thirds of the first tarsal joint. Tarsus—40 : 34 : 25 : 33.

♂.—*Head* in general shape like that of the ♀, but broader across the frons ; eye bare, not much over one-fifth of the face ; scrobes more flattened on outer side, whole face much broader than deep. Between the anterior ocelli and scrobes about thirty short hairs, distributed equally about the mid line ; one or two near the eye, longer, and forming a fairly regular orbital row ; on vertex two to three stronger bristles, there being two also on the occiput and three on the ocellar area.

*Mouth-parts* : labial palpus with two distinct bristles. Stipes with one small bristle on each side of mid line in addition to the stronger one near the palpus. Lingua with four hairs from raised cells.

*Antennae* twelve-jointed (fig. 15, *a*) : scape, pedicel, three ring joints, funicle four, club three. Scape, length to breadth, 8 : 3 ; swollen sides not subparallel ; subapical ventral bristle stronger than the others. Pedicel one-half the scape ; length to breadth, 2 : 1 ; with very strong bristles, five being really spines. The four joints of the funicle are subequal in diameter, but the first pair appear larger, being cylindrical, while the second pair are more bead-like, the angles being rounded off ; the joints bear on the upper surface long tubular hairs (from five to three), besides the usual hairs (which are stronger than in the ♀) and sensory channels with triangular spurs (fig 15, *b*) ; these channels are not developed on the lower surface. Club joints in the proportion, 15 : 17 : 6 ; the first with long hairs like the funicle. Length of antenna, .64 mm.

*Wings* : fore wing, 1 mm. long, .44 mm. broad. Submarginal : marginal : radius—4 : 4 : 1 ; the marginal broad, the post-marginal obsolescent ; the radius as in the ♀, with four cells, with a relatively larger more quadrate termination. Hind wing, .9 mm. long, .2 mm. broad. Below the hooks and on the vein ending are six minute straight bristles.

*Thorax* as in the ♀, the mesonotum bears at the posterior end of the mid ridge one bristle on each side and one at the postero-lateral angle ; the tegulae also in both bear a strong and a weak bristle ; mid lobe of mesonotum with only twenty-five bristles before the two strong posterior ones. Metanotum with the sunken side-pieces obscurely reticulate, not smooth as in the ♀ ; both sexes with one minute hair near

the middle of the anterior edge of this sclerite. Propodaeum with a minute hair before the postero-lateral angle (possibly not in ♀), no trace anteriorly of ridge separating notum from pleura; the sides posteriorly more convergent than in the ♀, and the postero-lateral angles more defined; the posterior edge more undulated.

*Abdomen* almost entirely dark, with only an obscurely lighter medio-basal area. Segments subequal. In the abdominal chaetotaxy the sexes are similar, the bristles or hairs being dispersed in lateral patches about the mid line; on tergites 4 and 5 they tend to form regular rows; on tergites 2 to 4 the ♂ is slightly more setose. On each side off the mid line there are bristles as follows:—Tergite 1, 7 to 8; T. 2, 8 to 10; T. 3, 9 to 11; T. 4, 14 to 17; T. 5, 20 to 21; T. 6, 12 to 13. In the ♀ tergite 7 bears seven bristles outside the stylet and about fifteen between the stylets; in the ♂ the bristles, both outside and inside, are more numerous.

*Legs*: fore legs with ten to eleven short bristles on outer side of the coxae; femur more swollen than in the ♀; tarsal joints—15:20:18:26. Mid legs with the apical spine of the tibia much frayed; first tarsal joint with half-a-dozen longish hairs beneath; tarsal joints—45:25:20:30. Hind legs with the tarsal joints as, 30:28:20:33.

UGANDA: Wema Island, Victoria Nyanza, 2 ♂♂ and 6 ♀♀, bred from puparium of *Glossina palpalis*, R.D. (Dr. G. D. H. Carpenter).

*Holotype*—a ♀.

### **Syntomosphyrum phaeosoma**, sp. nov. (fig. 15).

♀.—Similar to *S. glossinae*, sp. n., but smaller, with shorter and more compact antennae. In general less shining and with an entirely opaque abdomen. As in *S. glossinae*, the base of the abdomen is smooth (to about the middle of tergite 3), but the succeeding tergites are considerably roughened (raised reticulate). The most appreciable differences, however, are in the antennae (see fig. 15, *i*).

*Length*, nearly 1.3 mm.; alar expanse, nearly 2.25 mm.

NORTHERN NIGERIA: 1 ♀ bred with *Pleurotropis amaurocoela*, sp. n., from the cocoon of a Braconid (*Apanteles* sp.) parasitic on the leaf-roller of cotton (*Sylepta derogata*, F.), 18.ix.13 (Thos. Thornton).

### Genus TETRASTICHUS, Haliday.

The species described below belongs to the section of the genus which has an elongated, almost *Hyperteles*-like abdomen. In general build it resembles *T. brasiliensis*, Ashm. (Mem. Carneg. Mus., i, p. 515, pl. xxxix, fig. 2), but differs in size, colour, etc.

### **Tetrastichus melichlorus**, sp. nov. (fig. 17).

A yellowish or tawny species, with dark head and dusky antennae; prothorax and nearly all of the mesothorax dark, as are also the tip and mid region of the abdomen. The propodeal spiracle lies in a dark patch and the caudal spiracle likewise is outlined in black. The legs are clear honey-yellow, the hind coxae large and coarsely shagreened.

♀.—*Head* longer than deep (5:4). Vertex and frons reticulate, with many bristles, about eight on the occipital edge, with a number below on the occiput itself; three

on each side at the orbits and about 16, short, stout and spinose, on the ocellar triangle; on each frontal plate from the upper suture to the scrobes are about a dozen bristles, placed mainly near the orbits. Scrobes rather large, oval, just above the base line of the eyes; a distinct keel from the clypeal corner to the lower angle of the eye, with nine to ten short bristles inside, on the frontal aspect.

*Antennae* 11-jointed (fig. 17, *a*): scape, pedicel, three ring joints, funicle of three, club of three. Length, 1 mm.; long, cylindrical and not expanded in the club. The scape is flavescent, and the other joints (except the ring joints) brownish and infuscated; the pedicel a little flavescent below. Scape three-and-a-half times as long as broad, with one strong subapical ventral bristle, and two to three behind on the same line. Pedicel not half the length of the scape, longer than broad (8:5). Three ring joints, the basal one with a broad articulation, the others more leaf-like, but apparently distinct. Funicle joints cylindrical and elongate, about twice as long as broad, and subequal; the middle one a trifle longer than the first or the third, each bearing about 12 sensoria with strong processes. Club joints in the proportions 9:8:6; the third joint tapered into a stout spur, on which stands a minute bristle; the sensoria well developed.

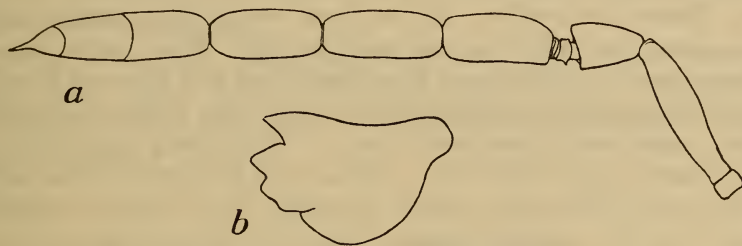


Fig. 17. *Tetrastichus melichlorus*, sp. n.; *a*, antenna;  
*b*, mandible.

*Mouth-parts*: the cardo boot-shaped, the heel rounded off, and the stipes large. The maxillary palpus four to five times as long as the labial, with one post-median outer hair, two (a shorter and a longer) subapical, and exactly at the apex, a thick truncated hyaline bristle. Galea with four or five of the stronger bristles rising from cells. Mentum with a single, rather long bristle well behind the base of the palpi. Lingua with four setigerous marginal cells. Mandibles (fig. 17, *b*) with three teeth, the outer (ventral) pair rather deeply separated and of equal length, the innermost marked off by a shallow concavity and with rounded apex; behind the third tooth the mandible swells out, but contracts at the middle of the inner edge, being again slightly swollen on the same edge near the base.

*Thorax* longer than broad (3:2). *Pronotum* entirely brownish black, with a posterior row of eight to ten bristles, and many in front. *Mesonotum* yellowish, with a distinct brown blotch extending from the base four-sevenths towards the apex; apically the blotch is a little incised medianly, and at the sides near the parapsidal furrows there is a narrow, indefinitely paler margin; along this margin are placed six hairs, and a stronger bristle near the apical corner. The median furrow is broad, and completely interrupts the moderately coarse, even reticulation of the lobe.

Parapsides with still coarser (but hardly raised) reticulation, deeply invaded by the narrow, finely striate reticulate axillae, and provided with seven to eight bristles, that above the tegulae being stout. *Scutellum* yellow, with browner tinge posteriorly; a little broader than long (10 : 9), with four wide deep sulci, which divide the width in the ratio 3 : 4 : 3; evenly striately reticulate; each dorsal side-piece bears two bristles, and there is another posteriorly above the metathorax. *Metanotum* narrow, mid lobe reticulate, side-pieces rugulose. Propodaeum with strong keel and much raised; pale, darker round and below the stigma, which is shortly oval or nearly round, with two bristles below.

*Wings*: fore wing not quite three times as long as broad; 1.8 mm. long, .7 mm. broad. Submarginal cell narrow, with six bristles on the distal third, and four on the basal third, the mid third bare; submarginal vein with five to six bristles; the inner edge along the marginal vein with 13 to 14 fringing bristles; six on the radius. Submarginal : marginal : radius—3 : 6 : 1; the radius rather long and apically gradually expanded. Hind wing, 1.3 mm. long, .3 mm. broad.

*Legs*: fore legs entirely pale, a little tinged with brown on the inner sides of the coxae; the sternum and episternum still darker. Coxae coarsely reticulate, with about 15 bristles evenly distributed on the surface, one (subapical) being longer and stouter. Femur not swollen; on the basal two-thirds a ventral row of five bristles, and about two others on the outer surface. Tibia longer than femur; apical transverse comb of six spines. First tarsal joint with a row of 10 to 12 short spines on the inside; proportions of joints—35 : 38 : 35 : 45. *Mid legs* long and slender; entirely pale; coxae with three bristles only. Tibiae much longer than femora. Proportions of tarsal joints—60 : 50 : 40. Tibial spine five-sixths of first tarsal joint. *Hind legs* with the coxae large, swollen, superiorly very coarsely reticulate, bare exteriorly, save for the subapical median bristle. The femur bears about twelve external bristles. The tibial spur is strong and equals the first tarsal joint, and there is a transverse row of seven to eight spines.

*Abdomen* with the peduncle broad; second tergite pale, third dark at sides, fourth and fifth entirely darkened, sixth with an anterior dark band produced medianly behind and two paler spots at the sides. Spiracles very small, circular, set in a brown spot. All the tergal surface, from the fourth to the seventh, coarsely reticulate and raised; second tergite smooth, third reticulate at sides. The second tergite has two to three bristles at the side, the third five to six, the fourth and fifth eight to nine and seven to eight respectively, with a few in front; the sixth has 15 to 17 in a patch on each side, and a transverse posterior row of seven bristles; the seventh tergite bears on each side, mainly behind the spiracles, about 16 bristles. The tergites increase in length gradually, 2 to 5 being subequal, and 6 considerably longer. The eighth tergite long and conical, densely covered with spiny bristles, with the stylets distally placed. Stylet short with swollen base, three short and one long bristle. The ninth tergite articulated considerably behind the apex of the eighth; free portion to base as 3 : 5. The free flaps are brownish yellow, with a broad subapical dark band and a light spot on the apex.

*Length*, over 2.75 mm.; alar expanse, over 3 mm.

GOLD COAST: Aburi, 4 ♀♀ (*W. A. Patterson*).